National publication bias

SIR — The availability on disk of *Current Contents* makes possible a variety of statistical analyses of publications. The letter on national publication bias in scientific journals from E. Ernst and T. Kierbacher (*Nature* **352**, 560; 1991) prompts me to report what may be called a 'language bias'. The number of publications originating from selected major countries was searched in issues 18–23 of *Current Contents* Life Science volume 34, covering 600 journals. The United States as such was omitted because the papers of that country appear under each state name, but three major states (California, New York and Texas) were searched for comparative purpose.

The table shows that in the period examined, the United Kingdom (sum of England, Scotland, Wales and Northern Ireland) produced approximately the same number of publications as Japan and West Germany combined. It is also seen that Canada produced approximately as many publications as West Germany.

One would expect that countries with comparable gross national products (GNP) per capita would produce a similar number of publications per head (see table). The differences between the countries became even more striking: the United Kingdom produced as many papers per capita as Japan, West Germany and France together. Interestingly, the countries (or states) producing the most publications per capita were English-speaking countries (or with a majority of native English-speaking inhabitants). The only exception is Sweden.

It is suggested that this bias originates from the fact that the vast majority of the publications in the scientific literature are in English (the excellent English of Swedes is well known). The usefulness of a common language for science is not questioned, and English has proved to be that. But writing in English can be a considerable burden to those not fluent in that language, which could partly explain the bias (science policies and evaluations systems are certainly contributing too). In addition, the bias described above has certainly some other effects. For example, because publications have to be written in good English, the editorial boards of many international high impact journals are strongly dominated by scientists from English-speaking countries. Another example is with the evaluation of research groups from different countries when competing for international grants (for example in the European Communities).

It would be interesting to examine the average impact of publications from English vs. non-English-speaking countries to see if the bias persists.

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PUBLICATIONS IN SELECTED COUNTRIES OR STATES

Country (or state)	Total number of publications	Publications per million inhabitants
California	1274	62.1
New York	858	47.1
Texas	488	43.5
UK	2268	40.5
Canada	895	38.9
Sweden	315	38.0
Australia	440	31.0
France	887	16.6
West Germany	901	11.5
Japan	1311	11.4
Italy	544	9.6

Found in Vol. 34 issues 18–23 of *Current Contents* Life Science (600 journals).

Tissue shortage

SIR — The lack of human tissue for research and education, a problem again identified by Christopher Anderson's report "Beating the tissue shortage" (*Nature* **351**, 195;1991), has prompted animal welfare organizations in Britain and the United States to launch the Humane Research Donor Card (HRDC), with carriers requesting that "after my death any part of my body be used for medical and scientific research". The HRDC does not preclude people from also becoming donors for transplantation, and they can carry both types of card.

The card is an initiative of animal protection groups because human tissue is very much a neglected alternative to laboratory animals. In pharmacology for instance, the use of human material is still the exception rather than the rule, despite the limited relevance of most animal tissue studies[1,2]. In fact, analysis of papers presented at the April 1990 meeting of the British Pharmacology Society indicated that only a small proportion of experiments using isolated tissues employed material of human origin — 84 per cent used tissue from animals, mainly rats and guinea pigs.

Since February 1991, when the British group Animal Aid first launched the HRDC, public response has been overwhelmingly positive, with more than 60,000 cards already distributed, indicating a genuine desire to help both medical science and animals.

Many scientists have also welcomed the scheme[3] and not only for humane reasons: work with human tissues overcomes the problem of species variation and produces results directly relevant to people[1,4–6].

Nevertheless, to achieve its full potential, there needs to be well co-ordinated systems of tissue storage, with hospitals and research institutions carrying a list of intended donors, thereby reducing the chance of tissues going to waste. If people carry the HRDC and inform relatives of their wishes, the problems encountered in Philadelphia will be avoided.

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Designer data

SIR — Your issue of 26 September (*Nature* **353**, 294; 1991) illustrates a 1989 West German stamp showing a population pyramid for the German population for the year "1989" and a projected population pyramid for the year 2000. These two pyramids are incompatible, because, although they are ostensibly based on populations 11 years apart, scrutiny shows that they are actually 15 years apart (for example, the peaks at age 20, 45 and 55 in "1989" correspond to ages 35, 60 and 70 in 2000). Which then is correct? The two conspicuous troughs in the "1989" distribution, at ages 40 and 67, seemingly result from the birth cohorts of 1949 and 1922. It is more likely that this is the pyramid for 1985, 15 years before 2000, so that the two troughs correspond to cohorts with depressed birth rates at the ends of two world wars, in 1918 and 1945.

I conjecture that the stamp's designer had been supplied with demographic data for 1985, probably the most recent year for which accurate statistics were available. Knowing that the stamp was to be issued in 1989, to commemorate the centenary of the social security system, the designer changed the date (but not the data) to correspond to 1989.

Scientific data are rarely printed on stamps; when they are, then aesthetics should be less important than accuracy.

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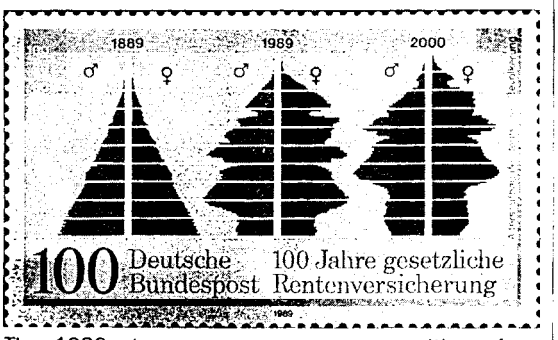
Energy costs of a long life

SIR — The publication in 1989 of a stamp commemorating the centenary of the German social security system (see figure) has, probably inadvertently, focused attention on the widely neglected phenomenon of the virtual doubling of the average life expectancy in advanced industrial societies over the past 100 years. Whereas the age distribution of agrarian or early industrial societies displays the shape of a pyramid typical of most biological populations (left-hand graph), the demographic picture of developed communities is reflected by a balloon-shaped function, the narrow base of which constitutes an artefact caused by the introduction of oral contraceptives during the 1960s (middle and right-hand graphs in the stamp).

Although many will ascribe this demographic miracle to a multitude of specific causes (notably the advances of biomedical sciences during the past century), the root cause deserves to be stated explicitly. The principal factors promoting longevity in humans (balanced nutrition, evasion of excessive toil, provision of medical care, social security and so on) are corollaries of developed societies characterized by sizeable gross national products (GNP). Because of the well-established correlation between GNP and energy consumption, it seems evident that the conspicuous doubling of the average life-span of whole populations (not of a minority) over the past 100 years is linked to the progressively increasing energy flow through society over the same time. Biological analogues demonstrate that similarly conspicuous innovations had been generally dependent on preceding discrete quantum steps in bioenergetic evolution involving upsurges in physiological energy consumption by about an order of magnitude and more[1]. This is approximately the factor by which the industrial ('extrasomatic') energy flux surpasses the per capita somatic flux in modern industrial societies (for instance, the 1.6-million population of the city of Hamburg has a physiological energy consumption of some 5,000 TJ yr^{-1}, whereas the energy expenditure of the community as a whole totals 100,000 TJ yr^{-1}.

A glaring demonstration of the interrelationship between the energy-related GNP and life expectancy has been furnished by the temporarily diverging socio-economic orders of former East and West Germany, with average life spans cut by 2.5 and 7 years for men and women, respectively, from the East[2]. Specifically as a result of this historical experiment, it is clear that average life expectancy for broadly the same human gene pool is apt to vary significantly in response to the socio-economic environment, with a conspicuous advantage for the more voracious energy consumers.

With these interrelationships established, it is not difficult to predict that there will be no voluntary way back from a high-energy to a low-energy economy. Naive criticism of modern industrial society ignores the privileged condition of its members in terms of both life expectancy and general diffusion of affluence, disregarding the fact that the recent rise of energy consumption by *Homo sapiens* to levels 10–20 times above the basic metabolic rate is glaringly beneficial to the species.



The 1989 stamp compares age composition of an agrarian/early industrial society (1889) to that of an advanced industrial society (1989 and projection for 2000). Note that the population 'pyramid' typical of poorly developed (low-energy) societies assumes the shape of an elongated balloon for high-energy societies (in these examples, this shape is gravely impaired by scars left by two major wars).

Although the increased energy flow through the human ecosystem is evidently responsible for this most important single improvement of the human condition in the history of mankind, its intrinsic potential for the emergence of an autotoxic (self-poisoning) effect due to the accumulation of toxic waste products of the industrial process remains a matter of concern[3]. The future of high-energy (industrial) societies will, accordingly, depend on man's capability to maintain an adequate energy flow while minimizing the adverse effects of his extrasomatic metabolism on the environment by suitable technological fixes[4].

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Smart whale

SIR — Daedalus (*Nature* **352**, 384; 1991) described a novel 'heavy-waterglider' whose undulating trajectory derives from the depth-related changes in density that follow from the unusual thermal properties of heavy water. Fact is even better than fantasy, for his design has been largely pre-empted by the sperm whale. The substitution of spermaceti oil for heavy water, and the closer control of heating and cooling by changes in the internal blood supply, make the sperm whale a much more flexible undulator[1]. It also has an operationally tried and tested 'smart' navigation system, instead of an automatic one. Its celestial navigation system is still classified information, the details of which are transferred only on a 'need to know' basis for regular migrations. Daedalus's vehicle "will be guided to rendezvous . . . by sonar steering commands". The sperm whale's mastery of the language of sonar completely outclasses its vehicular competitor, but the rendezvous of its choice is more likley to be a mate or a family party that Daedalus's "receiving tug".

As part of the promotional strategy for the vehicle, Daedalus asserts that "oceanographers will love the heavy waterglider". He should know that we already do love the sperm whale.

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Grand spectacles

SIR — As a sufferer from presbyopia, I have longed for the 'adaptive optics' spectacles proposed by David Jones (Daedalus, *Nature* **352**, 287; 1991). I have two suggestions for improvements.

First, the eye has significant chromatic aberration, so the infrared image will have to be slightly out of focus in order to focus the optical image perfectly. Second, I wish to retain what focusing ability I still have for occasions when I do not use my spectacles. I suggest therefore a bias and lag in the automatic adjustment, calculated to excercise my eye muscles so that they do not atrophy. Both effects would be simple for the microprocessor controlling the optics.

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